

Raman spectroscopic studies on inactivated and milk-extracted microorganisms

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A rapid detection of pathogenic bacteria that causes food-borne illness is needed to ensure food safety. Especially milk and other dairy products undergo a restrictive quality control concerning microbial contamination to prevent wide-ranging consequences in economy and public health. But beyond that, detection of small numbers of bacteria in a complex background is always a challenge. Conventional cultivation techniques for direct isolation and identification, which are employed up to now, are time-consuming processes and are additionally hampered by the rely on reagents with limited shelf-lives, the necessity of species-specific reagent like culture media, primer, etc. and trust in the experience of personnel. Over the years plating-methods have been replaced by other, more rapid immunological and molecular genetic approaches, whereby culture enrichment steps are still necessary. In contrast Raman spectroscopy offers the possibility to detect bacteria with a high specificity and limited sample preparation. Furthermore it is known as non-destructive technique. By using micro-Raman spectroscopy a spatial resolution below one micrometer can be achieved, which is in the size range of most microorganisms [1, 2].

Measurements on this work have been made by a fully-automated platform [3]. The evaluation of the data is taken over by chemometrical analyses, which enable a classification and identification of single microorganisms.

Studies of microbial contamination in milk took place by using spiked milk samples. Investigations were done with different strains of *Pseudomonas*, *Burkholderia* and *E. coli*. Because milk is a very complex food matrix appropriate extractions steps separating and concentrating bacteria prior to the Raman investigations will be needed.

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References:

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